Ishihara (USP 5,946,100); and claim 2 is rejected under 35 U.S.C. § 103(a) as being unpatentable over Ishihara. Also, claims 5, 6 and 8-11 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Applicant's Prior Disclosed Art ("APA") in view of Ishihara. For the reasons set forth below, Applicant respectfully requests withdrawal of the finality of the office action and traverses the rejections and requests favorable disposition of the application.

Argument

Withdrawal of Finality

Initially, Applicant respectfully requests that the Examiner withdraw the finality of the present office action in the present application since the office action introduces a new rejection under 35 U.S.C. §112 that was not previously asserted. Specifically, "under present practice, second or any subsequent actions on the merits shall be final, <u>except where the examiner introduces a new ground of rejection</u> that is neither necessitated by applicant's amendment of the claims nor based on information submitted in an information disclosure statement filed during the period set forth in 37 CFR 1.97(c)with the fee set forth in 37 CFR 1.17(p)." (MPEP §706.07(a)). Here, the Examiner has introduced, for the first time, a rejection under 35 U.S.C. §112, second paragraph. Further, the §112 rejection was not necessitated by a claim amendment since no claim amendments have been made and it was not necessitated by the filing of an IDS.

Prior Art Rejections

In regard to the prior art rejections of claims 1-6 and 8-11, Applicant submits that the Examiner has failed to set forth a *prima facie* case of anticipation. It is clear that the Examiner is

relying on the principles of inherency with regard to the prior art reference to Ishihara. This is known since the Examiner has not even attempted to show where within the asserted prior art reference the requirements of the equation recited in claims 1, 5, 6, 9 and 11 are shown. Instead, the Examiner has merely asserted that the recited equation "is satisfied" by the structure disclosed in Ishihara. To support the assertion, the Examiner provided a hand-drawn figure and a hand-written "derivation" of the recited equation required by the claims.

However, the Examiner has failed to provide any explanation whatsoever regarding how the alleged derivation applies to the asserted prior art reference. In other words, the Examiner has not demonstrated that the allegedly derived equation is an absolute consequence of the structure disclosed in Ishihara. As is well settled, when an Examiner relies on a theory of inherency, "the examiner must provide a basis *in fact* and/or technical reasoning to reasonably support the determination that the allegedly inherent characteristic *necessarily* flows from the teachings of the applied prior art." *Ex parte Levy*, 17 USPQ2d 1461, 1464 (Bd. Pat. App. & Int. 1990). Inherency may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient." *Ex parte Skinner*, 2 USPQ2d 1788, 1789 (Bd. Pat. App. & Int. 1986).

Here, the Examiner has failed to provide any such reasoning and, thus, the Examiner has not met his/her burden of establishing a prima facie case of anticipation. Moreover, the Examiner merely asserts that his/her "derivation" is born out of the "principle of the geometric optics". However, the Examiner has not provided any support at all for the derivation.

In effect, the geometries used by the Examiner to purportedly derive the equation explicitly recited in claims 1, 5, 6, 9 and 11 do not apply to the geometries of the optical elements in Ishihara. To the extent the Examiner relies on Figs. 6 and 7 of Ishihara, Applicant respectfully requests that the Examiner demonstrate where the variables t, R and θ apply to the optical elements disclosed. Absent such a conclusive showing, the anticipation rejection is not supported.

For at least the above reasons, none of claims 1-4 are either anticipated or rendered obvious by the disclosure of Ishihara.

In regard to claims 5, 6 and 8-11, because independent claims 5, 6, 9 and 11 recite the same equation as discussed above in regard to claims 1-4 and, further, because the APA also does not teach the recited equation, none of claims 5, 6, 9 and 11 are rendered obvious by the proposed combination of Ishihara and the APA. Claims 8 and 10 are patentable at least by virtue of their dependence on claims 6 and 9, respectively.

§112 Rejection

Although Applicant submits that a skilled artisan would understand how to derive the equation of claims 1, 5, 6, 9 and 11 from the present specification and drawings, Applicant is providing the following additional information in support of the equation recited, specifically, $Sr \geq 2t \bullet \tan\theta + R$.

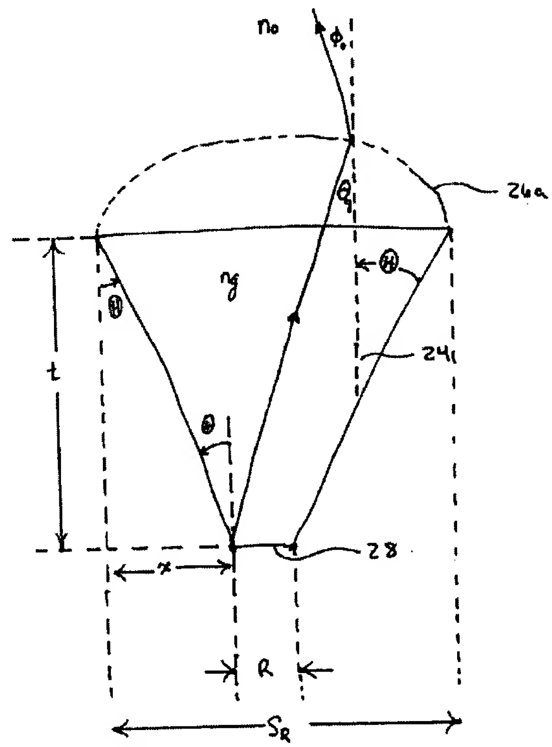
As is clear from the figures provided in the present application, specifically Fig. 3, a light entrance area 28 allows diffused light to enter. On the other hand, a microlens 26a is required to

efficiently refract the light entered through light entrance area 28 and collimate it from the hemispherical surface of microlens 26a.

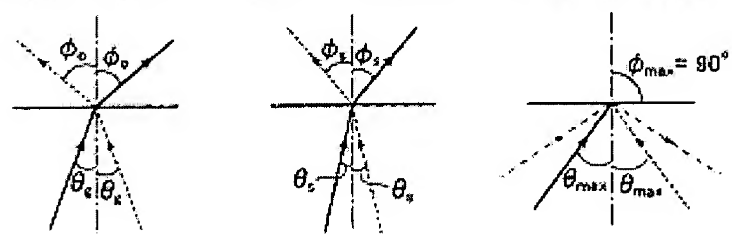
To assist in explaining the use of the equation, Sr $\geq$ 2t • tanθ + R, required by the claims, Applicant is providing below reference figures REF FIGS. 1-4 which are consistent with the figures of the present application.

REFERENCE FIGURE

REF FIG. 1



REF FIG. 2 **REF FIG. 3** **REF FIG. 4**



Considering the light refraction at the light entrance area 28 with reference to REF. FIG. 1, the light at an incident angle θ defined as θg with respect to the normal direction of the light exit surface from the lens substrate 24 having a refractive index ng is refracted at the light exit surface (boundary surface) of the lens substrate 26a and is emitted at an emitting angle Φ, defined Φ_0, with respect to the normal direction into air of the refractive index n_o ($ng>n_0$). This relation can be expressed as set forth below:

$ng \bullet \sin\theta g = n_0 \bullet \sin\Phi_0$ (Snell's Law) ... (1)

Accordingly, the light emitting angle Φ when the incident light θ is in the range of 0 to θg falls into the range of 0 to Φ_0, so that the emitted light should be collimated at angles in the range of 0 to $2\Phi_0$.

Please note that in REF. FIG. 1, SR represents the diameter of the microlens 26a, t represents the thickness of the lens substrate 24, and R represents the diameter of the light entrance area 28, and the tilt angle Θ of the conical surface formed by joining the circle of the light entrance area 28 and of the microlens 26a is defined by $(Sr-R)/2t = \tan\Theta$.

As shown in REF. FIG. 3, in cases where the incident angle θ of the incident light is set to be the incident angle Θs, which is smaller than the incident angle θg shown in REF. FIG. 2, the emitting angle Φ of the emitted light would be Φs which is smaller than Φ_0, i.e., in cases where the incident angle of the incident light is in the range of 0 to θs, the collimating range of the emitted light of 0 to $2\Phi s$ would also be smaller than 0 to $2\Phi_0$, thus increasing the collimating efficiency.

Furthermore, it is well known that when light advances from a material with a relatively high refractive index to a material with a relatively smaller refractive index, light at an angle larger than the critical angle will not exit its medium (i.e., the material with a high refractive index). This principle is also applied to the optical fiber technology.

In other words, the maximum value θmax of the incident angle θ where light can exit the medium (i.e., the material) can be established only when $\Phi = 90°$, as illustrated in REF. FIG. 4; this angle θmax is referred to as the critical angle.

Accordingly, as shown in REF. FIG. 4, the collimating range of 0 to 2Φ of the emitted light becomes maximum when $\Phi = 90°$, i.e., the incident angle 0 to θ falls in the range of 0 to critical angle θmax, and the collimating range of 0 to 2Φ of the emitted light falls into the range of 0 to 180°, resulting in the highest collimating efficiency. To this extent, also when the incident angle 0 to θ is larger than 0 to the critical angle θmax, the collimating range of 0 to 2Φ of the emitted light would fall into 0 to 180°. This case, however, is not preferable, since the emitting degree of the incident light as the emitted light would increase, and thus the amount of emitted light from the microlens 26a would decrease, meaning that the collimating efficiency as a collimating plate goes down.

Derived from the formula (1), above, is $ng \bullet \sin\theta gmax = n_0 \bullet \sin 90° = n_0$. With air refractive index $n_0 = 1$, the formula would result in $ng \bullet \sin\theta gmax = l$, and thus $\theta gmax = \sin\text{-}1(1/ng)$.

Here, if the incident angle $\theta \leq$ critical angle θmax, light can go out of the collimating lens 26a. On the other hand, if the incident angle $\theta >$ critical angle θmax, light cannot go out of

the microlens 26a. Accordingly, it is preferable to establish the relation as the incident angle θ=critical angle θmax.

Thus, as can be seen from REF. FIG. 1, the incident angle θ can be anything smaller than the tilt angle Θ of the conical surface formed by joining the circle of the microlens 26a and of the light entrance area 28 in the figure. Further, the tilt angle Θ can be recognized as the maximum incident angle. Therefore, it is ideal to have the tilt angle Θ =critical angle θmax, i.e., (Sr-R)/2t=tan Θ =tanθmax, with the proviso that, θmax=sin-1(1/ng). In short, Sr=2t•tanθmax+R is almost the ideal relation.

However, in consideration of stray light (e.g., flare), the angle should be slightly larger, and thus the present invention recites, Sr $\geq$ 2t•tanθmax+R (with the proviso that θmax=sin-1(1/ng)) (see page 20, line 2 to page 21, line 8 in the present specification).

The equation, Sr $\geq$ 2t•tanθ+R (with, the proviso that θ=sin-1(1/ng)) of claims 1, 5, 6, 9 and 11 was derived as described above.

From the above discussion, the boundary incident angle θ of light to be emitted outside has to be the maximum incident angle, that is, the critical angle θmax.

Accordingly, insofar as the Examiner's hand-written formula on the attached sheet of the office action involves the incident angle θgmin, its derivation is clearly different from that of the equation, Sr $\geq$ 2t•tanθ+R (with the proviso that θ=sin-1(1/ng)) of claims 1, 5, 6, 9 and 11 of the present application.

In view of the above discussion regarding the equation explicitly recited in independent claims 1, 5, 6, 9 and 11, Applicant maintains that Ishihara fails to teach or otherwise suggest,

either alone or in combination with the prior art discussed in the background section of the present application, the subject matter in claims 1-11. Accordingly, the rejection of claims 1-11 should be withdrawn.

Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

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